## CHAPTER 1 – Prologue

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## Practice for Constructed Response

Page 16-23

1. Data was not collected at the same time of day.
2. a. 2
   b. As population increases, pollution increases
3. a. D
   b. All the pollution from up river goes by Location D.
4. The egg was denser than the drinking water, but not as dense as the salt water.
5. To save lives and as much property as possible.
6. 4.0 g/cm³
7. 20 grams
8. 4.0 cm
9. Between the lines for materials B and C.
10. Remain the same.
11. 1.0 g/mL
12. The same as the original
13. 2.0 %
14. 4°C
15. a. A on the top, B in the middle, and C at the bottom
     b. A is least dense and C is most dense
16. Volume
17. 2.5 g/cm³
18. Smallest volume has the least mass.
19. less
20. 1
21. The acidity (pH) rose from 1932 to 1975
22. Most of the fish had died.
23. 4.5 ± 0.2
24. 1. Observation – you can see it.
    2. Observation – measurements indicate it.
    3. Inference – don’t know what it is made of.
    4. Observation – can see it.
25. 32 g.
26. graph # 2, because as the mass increases, the volume increases, keeping the density the same
27. greater
28. decrease
CHAPTER 2: Measuring Earth

Practice for Constructed Response
Page 38-46

1. As a traveler moves from location C to location B, the altitude of Polaris increases.
2. The altitude of Polaris is greatest at location A.
3. a. The altitude of Polaris at location D is 23.5°.
   b. The altitude of Polaris at location D is determined by the rule which says that a person’s latitude is equal to the altitude of Polaris. If you know the latitude of a location, then the altitude of Polaris will be the same.

4. a. gradient = change in field value
distance

   b. \( g = \frac{175 \text{ m} - 150 \text{ m}}{40 \text{ km}} \)
   c. \( g = .625 \text{ m/km} \)
   d. \( g = .6 \text{ m/km} \)

5. The approximate latitude for location A is about 25°N (could be + or – 3.5°) and in longitude is 105°W (+ or – 3.5°)
6. Points A, B, and E all have the same longitude
7. Points B and C both have the same latitude.
8. 839 meters
9. Mill Creek flows east to west
10. Where the contour lines cross the river, they form a “u-shape” which points upstream.
11. Line CD is the steepest. It has a gradient of approximately 15 m/km.
12. a. See diagram below – two degree isotherms were drawn:

   ![Diagram of isotherms]

   b. The point with the highest temperature is at 28 degrees (upper left).

13. a. Gradient = \( \frac{\text{change in value}}{\text{change in distance}} \)
    b. Gradient = 6 degrees
       3 meters
    c. Gradient = 2 degrees/meter
14. See diagram below:

15. a. The major source of air pollution is located between points B and C.
   b. The location is inside the 40,000 particles/cm isoline.
   c. The winds responsible for this pattern are blowing from west northwest to east southeast.

16. 

17. Temperature Field Map (°C)

18. a. Gradient = \frac{\text{change in field value}}{\text{change in distance}}
   b. Gradient = \frac{27°C - 24°C}{3\text{m}}
   c. Gradient = 1°C/meter

19. 

20. a. Gradient = \frac{\text{change in field value}}{\text{change in distance}}
   b. Gradient = \frac{22°C - 19°C}{6\text{m}}
   c. Gradient = 0.5°C/m

21. 66°F (± 1°)
## CHAPTER 7: The Atmosphere

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## CHAPTER 8: Climates

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**Practice for Constructed Response**

**Page 416-423**

1. Answer is 1
2. Of the three locations, the duration of insolation is the shortest for the Tropic of Cancer because the arc of the sun across the sky at that location is the shortest.
3. In three months, the sun's apparent path across the sky will begin at or near the Equator and be shorter.
4. Of the three locations, the noontime shadow will be longest in the Arctic Circle, because the altitude of the sun above the horizon will be the smallest, therefore the shadow will be the longest. The higher the sun is (the greater the angle) in the sky, the shorter the shadow.
10. The amount of energy required for cooling the house is greatest in July rather than June, because although the amount of radiation from the sun drops off, the amount of energy gained (absorbed) is greater than the amount of energy lost (radiated), therefore, the temperature would continue to rise if the air was not cooled.

11. The amount of energy collected at a house 500 kilometers further north would be less because the angle of insolation would be less every day.

12. More energy is needed in July than in January because the amount of energy needed for cooling the house in July is greater than the amount of energy needed for heating the house in January.

13. Cities A & B

14. The sequence of cities in order of decreasing yearly precipitation is B, D, A, and C.

15. The evidence indicating that the graph represents city R is the precipitation and the potential evapotranspiration. The P/Ep for the graph is 0.14. The only city that has that value is City R. All the other cities have a higher value.

16. The windward side of mountains cool slowly due to the condensation of water vapor as the air rises over the mountain. Latent heat of evaporation is released by the water vapor as it condenses. This slows the cooling rate. On the leeward side of the mountain, there is no water to evaporate. Therefore, the heating rate is greater, and the temperatures on the leeward side of mountains is higher.

17. The peaks in the graph are probably caused by sudden storms swelling the streams.

CHAPTER 9: Astronomy
Practice for Constructed Response
Page 485-493

1. A person at Point B would be unable to photograph the moon during the following 24 hours because Point B is at the South Pole and a person at the South Pole will not be able to see the Sun on that day. At the South Pole, although the Earth is rotating, the 90 degree latitude point does not rotate to a different position.

2. a. The number of daylight hours at location A will be greater than the number of daylight hours at location E.
   b. At location A, the parallel of latitude (the Equator) is half in darkness, so the daylight period is about 12 hours. When the Earth is tilted away from the Sun, the daylight period becomes shorter, the further north a person travels.

3. As the Earth moves from position B to position C, the intensity of insolation received by the Earth increases because the Earth moves closer to the Sun.

4. & 5

6. The apparent path of the Sun changes across the sky on a daily basis because the Earth revolves around the Sun while keeping its tilt pointed parallel and 23.5° from the plane of the ecliptic.

7. Of paths I, II, and III, path AB has the shortest period of daylight because it has the shortest arc, while path EG has the longest period of daylight and the longest arc.

8. The length of the shadow becomes longer each day because the altitude of the noon sun decreases daily.
   a. The length of the stick's shadow increases.
   b. The length of the shadow changes each day because the Earth revolves around the Sun.

9. According to the Earth Science Reference Tables, the period of Uranus is 84 years.

10. a.

    b. Of the nine planets listed in the chart above, the one most like the Earth is Venus. Their periods of revolution, eccentricities and Equatorial Diameters are similar.

11. The satellite's orbital speed is greatest at Point A because it is closest to the Earth at that point. The closer an object is to Earth, the faster it travels.
12. a. Eccentricity = \frac{\text{distance between foci}}{\text{length of major axis}}

b. Eccentricity = \frac{2.5 \text{ cm}}{7.0 \text{ cm}}

c. Eccentricity = 0.357

d. No units

13. As the satellite travels from A through B, C, and D, and returns to A, the gravitational attraction decreases until it reaches C and then increases until it returns to A. It is the greatest at A and least at C.

14. The Earth revolves 360° in its revolution around the Sun in 365 days which is just under 1\% day.

\[
\frac{360°}{365 \text{ days}} = 0.99\% \text{ day}
\]

15. The Earth's temperatures are more dependent on the angle and duration of insolation than to the distance from the Sun.

16. Allow credit for correctly drawing an arrow in the direction of Polaris. This credit may be allowed even if the arrow does not pass through two stars, as long as the arrow shows the correct direction to Polaris.

17. Planets' Average Orbital Speed vs. Average Distance from Sun

![Graph of Planets' Average Orbital Speed vs. Average Distance from Sun]
18. Planets with the higher orbital speeds are located closer to the Sun. Distance from the Sun and orbital speed are inversely related.
19. Mars and Jupiter
20. answer #2
21. answer #4
22. a. – b.

23. Earth's orbit is more circular than Mars' orbit. Mars has a more eccentric orbit.